UNCLASSIFIED
(CLASSIFICATION)

DOCUMENT NO.
BNWL-CC-887

ISSUING FILE

COPY NO.
20-

DATE
November 1, 1966

PROJECT

BATTELLE-NORTHWEST
RICHLAND, WASHINGTON

TITLE

EARTH SCIENCES WASTE DISPOSAL INVESTIGATIONS
JANUARY - JUNE, 1966

AUTHOR

Jay R. Eliason

DISTRIBUTION

NAME	BUILDING	AREA
Battelle-Northwest		
G. J. Alkire	222-U	200-W
J. R. Bovingdon	329	300
R. E. Brown	2707-U	200-W
J. P. Corley	329	300
J. R. Eliason	2707-U	200-W
W. L. Fisher	3706	300
R. F. Foster	328	300
J. J. Fuquay	326	300
R. B. Hall	3706	300
W. A. Haney	222-U	200-W
F. E. Holt	329	300
E. R. Irish	325	300
R. L. Junkins	Federal	700
A. R. Keene	328	300
J. M. Nielsen	329	300
H. M. Parker	3201	3000
D. W. Pearce	325	300
L. C. Schwendiman	325	300
F. W. Woodfield	3201	3000
300 Files		
Extras (15)		

NAME	BUILDING	AREA
Douglas United Nuclear, Inc.		
T. W. Ambrose	1704-H	100-H
R. G. Geier	1760-D	100-D
P. C. Jerman	1760-D	100-D
Isochem, Inc.		
G. E. Backman	222-T	200-W
S. J. Beard	271-B	200-E
D. J. Brown	271-U	200-W
V. R. Chapman	2704-W	200-W
R. E. Roberts	2704-W	200-W
D. T. Crawley	234-5	200-W
J. P. Duckworth	202-A	200-E
J. W. Fillmore	234-5	200-W
G. L. Hanson	202-S	200-W
G. R. Kiel	271-U	200-W
W. N. Koop	222-T	200-W
H. C. Rathvon	202-A	200-E
R. J. Sloat	271-U	200-W
R. E. Tomlinson	2704-E	200-E
L. L. Zahn	202-A	200-E

ROUTE	PAYROLL NO.	LOCATION	FILES ROUTE DATE
Production Reactor Div	6311	Pub	SEP 1 0 1966
Lou Phillips Craig (Ann Rowe)			

UNCLASSIFIED
(CLASSIFICATION)

(TO BE USED ON UNCLASSIFIED AND OFFICIAL USE ONLY DOCUMENTS)

84-1100-032 (1-65) AEC-RLOO RICHLAND WASH.

UNCLASSIFIED
(CLASSIFICATION)

DOCUMENT NO. BNWL-CC-887

ISSUING FILE | COPY NO. | DATE

PROJECT

BATTELLE-NORTHWEST
RICHLAND, WASHINGTON

TITLE

EARTH SCIENCES WASTE DISPOSAL INVESTIGATIONS

JANUARY - JUNE, 1966

AUTHOR

DISTRIBUTION

NAME	BUILDING	AREA
USAEC		
J. T. Christy	Federal	700
N. W. Fraser	Federal	700
J. E. Goodwin	Federal	700
G. B. Vincent	Federal	700
Vitro Engineering Company		
D. E. Anderson	Federal	700
Hanford Occupational Health Foundation, Inc.		
F. E. Adley	747	1100

NAME	BUILDING	AREA

ROUTE TO	PAYROLL NO.	LOCATION	FILES ROUTE DATE

UNCLASSIFIED
(CLASSIFICATION)

(TO BE USED ON UNCLASSIFIED AND OFFICIAL USE ONLY DOCUMENTS)

54-1100-032 (1-65) AEC-RLOO RICHLAND WASH.

EARTH SCIENCES WASTE DISPOSAL INVESTIGATIONS

JANUARY - JUNE, 1966

November, 1966

By
Jay R. Eliason

PACIFIC NORTHWEST LABORATORY
RICHLAND, WASHINGTON
operated by
BATTELLE MEMORIAL INSTITUTE
for the
UNITED STATES ATOMIC ENERGY COMMISSION UNDER CONTRACT AT(45-1)-1830

84-1100-057 (6-66)
ASC-BLOG RICHLAND, WASH.

TABLE OF CONTENTS

EARTH SCIENCES WASTE DISPOSAL INVESTIGATIONS

JANUARY - JUNE, 1966

INTRODUCTION

The Hanford Project has over 500 Wells which are used for the surveillance of radionuclides in the ground resulting from waste disposal. Wells are located at disposal sites to monitor the migration of radionuclides in the soil and to determine when a disposal facility is to be abandoned. Outside of the immediate disposal areas, wells are sampled to determine the movement of contaminants in the ground water zone. The spread of wastes in unconfined ground water aquifers is followed by routine sampling, and the confined aquifers in the area are sampled frequently where possible.

This report is prepared semi-annually by the Earth Sciences Section to give an evaluation of ground water contamination resulting from disposal of plant effluents. A map of gross beta concentrations in the ground water is presented to define contamination spread from the disposal areas. The data presented in this report were collected during the first six months of 1966; the preceding report in this series is BNWL-CC-574.(1)

All ground water samples were collected by the Environmental Monitoring Unit and analyzed by the Radiological Analysis Unit.

Analytical results are presented for gross beta activity in the unconfined ground water aquifer and gross beta activity at depths in the ground water (Tables I and II respectively, Appendix). Results are given where concentrations of radionuclides are above the routine detection limit, 0.08 pCi/cc, for gross beta. The average concentrations detected during the previous report period are listed for comparison. The locations of wells referred to in this report may be found by referring to the well-locations maps published in the latest Hanford Wells document.(2)

EVALUATION OF GROUND WATER MONITORING DATA

Ground water samples are analyzed routinely for gross beta; this is generally calculated as Ru^{106} -Rh^{106} because isotopic analyses have shown that Ru^{106} -Rh^{106} is the primary beta emitter in the ground water. Other analyses are made at specific sites for gross alpha, Sr^{90}, Cs^{137}, and other critical isotopes. The gross beta results are plotted on a water table contour map and iso-concentration lines are drawn to show the two dimensional extent and direction of contamination spread. Figure 1 shows the extent of ground water gross beta contamination as of June 30, 1966.

200-East Area

Beta emitter concentrations in the ground water beneath 200-East Area have shown no significant change during this report period. Gross beta concentrations in 200-East Area wells are tabulated in Table I of the Appendix.

Analyses were made for specific isotopes beneath some inactive and all of the active disposal sites in 200-East Area. Ground water beneath the 216-BY crib site contained Co^{60} concentrations averaging 4 pCi/cc during this report period which is slightly lower than the concentrations observed during the last report period.

Concentrations of Sr^{90} just above the routine detection limit of 0.01 pCi/cc were observed in wells monitoring the 216-A-10, 216-A-8, 216-A-27, 216-C-10, and 216-A-36B cribs. An increase in beta activity was observed in wells monitoring the 216-A-36 crib and Co^{60} was detected at concentrations averaging 3 pCi/cc during this report period. The distribution system in the 216-A-36B crib was changed to distribute the waste more evenly over the length of the crib. Alpha emitters were detected in the ground water beneath the 216-A-10 and 216-B-7 cribs at levels just above the detection limit of .01 pCi/cc.

Travel time estimates of beta emitters from disposal sites to wells down gradient have been made based on variations in beta activity release from Purex and the subsequent corresponding appearance in wells down gradient, HW-80909.(3) In late 1962 an increase in beta activity discharged to the 216-A-10 crib for a two month period was observed and a peak in beta activity at well 699-34-39A was predicted to be evident in 1965. The maximum activity level in well 699-34-39A was observed in January, 1965 as shown in Figure 2. This travel time of 26 months confirms the travel time previously predicted. The entrance of activity into ground water is reflected in the analysis of samples from well 299-E17-1, which is located at the 216-A-10 crib site, and from well 299-E17-2 which is located 800 feet east of the crib. Peak concentrations observed in the three monitoring wells (Figure 2) are significantly lower than the gross beta concentrations noted in the waste for several reasons. A reduction factor of about ten to twenty can be attributed to essentially complete decay of the Ru^{103} and appreciable decay of the Ru^{106}. Also, though Ru in this waste stream exhibits relatively poor ion exchange characteristics, past research showed that about 60 per cent will be held on the soil by sorption mechanisms. The significant reduction in peak concentrations evident between the two close-in wells and well 699-34-39A is attributed primarily to dispersion of waste in the saturated zone and the unavoidable compositing of waste-containing and uncontaminated ground water in the well sampling operation.

200-West Area

Minor changes in beta concentrations beneath 200-West Area were observed in the last six months. Gross beta activities in 200-West Area wells are tabulated in Table I of the Appendix. The wells monitoring the 216-S-9 and 216-Z-7 cribs showed increases in beta activity. Wells monitoring the 216-T-19, 216-T-27, 216-S-21, and 216-S-20 (Redox Lab) cribs contained low but detectable concentrations of Sr^{90}. The 300 Area waste which was discharged to the 216-Z-7 crib is now being discharged to the 216-T-34 crib. Beta activity concentrations in the ground water increased at the 216-Z-7 crib site, and low but detectable concentrations of Co^{60} and Sr^{90} were observed. Isotopic analysis of ground water samples from beneath the abandoned 216-S-1&2 cribs showed Sr^{90} concentrations averaging 49 pCi/cc. Strontium-90 also continued to be detected beneath the abandoned 216-S-7 crib.

A monitoring well (299-W22-26) at the 216-S-9 crib contained gross beta concentrations of 18,000 pCi/cc, Cs^{137} concentrations of 25 pCi/cc, Sr^{90} concentrations of .04 pCi/cc, and Co^{60} concentrations of 6 pCi/cc. These values were compared with the concentrations in samples obtained from a new well drilled 20 feet closer to the 216-S-9 crib. The new well, 299-W22-26A, contained gross beta concentrations of 9700 pCi/cc, but Sr^{90} was below the detection limit. A cross section of the 216-S-9 crib site is shown in Figure 3. The points A, B, C, and D are locations where samples of liquid were taken and analyzed for gross beta and Sr^{90}. Sample A, taken from a saturated zone encountered at 133 feet, contained 36,000 pCiβ/cc and 0.7 pCiSr^{90}/cc. Sample B, taken from well 299-W22-26, contained 18,000 pCiβ/cc

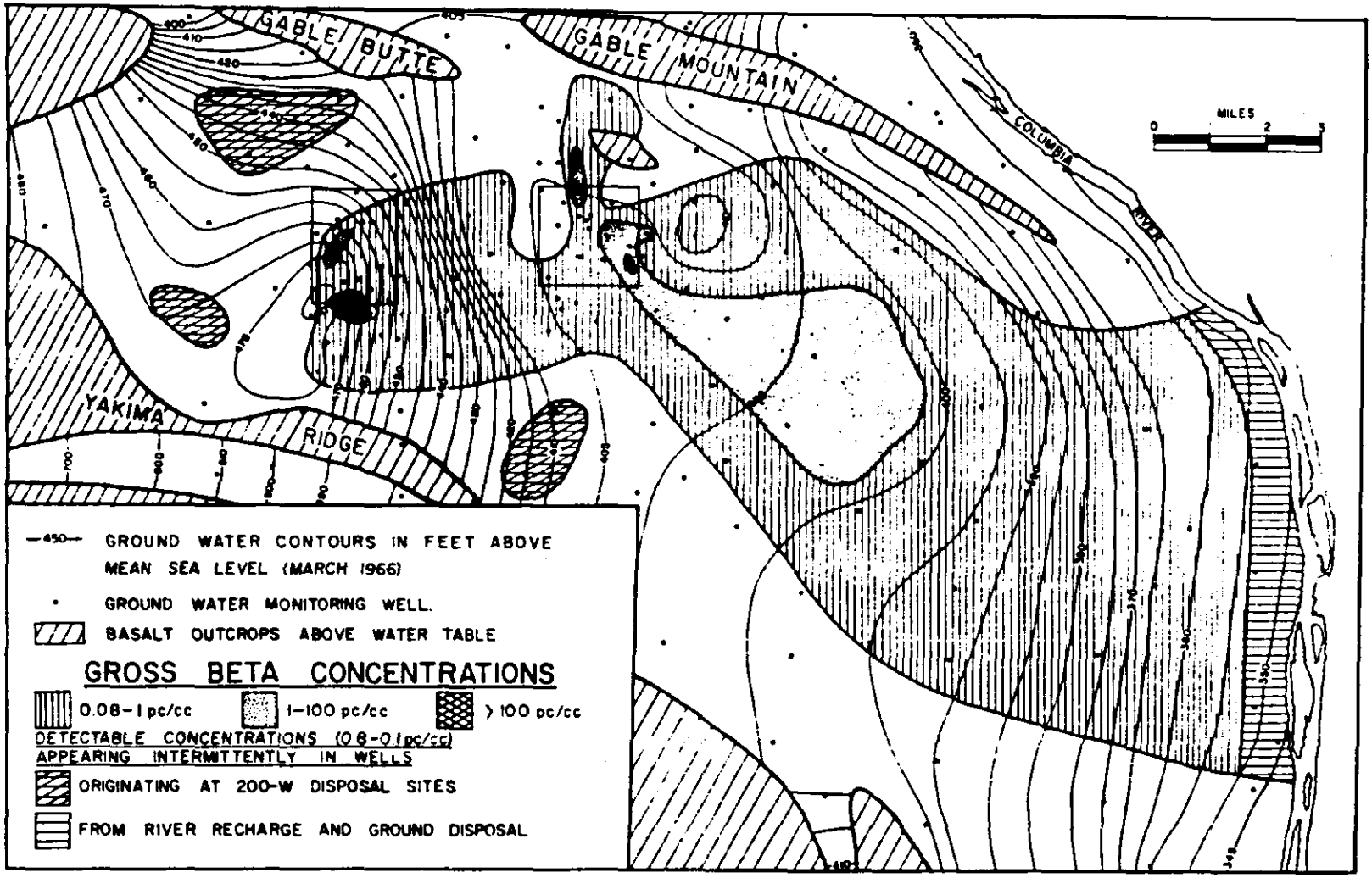

FIGURE 1

Extent of Ground Water Gross Beta Contamination, January-June, 1966

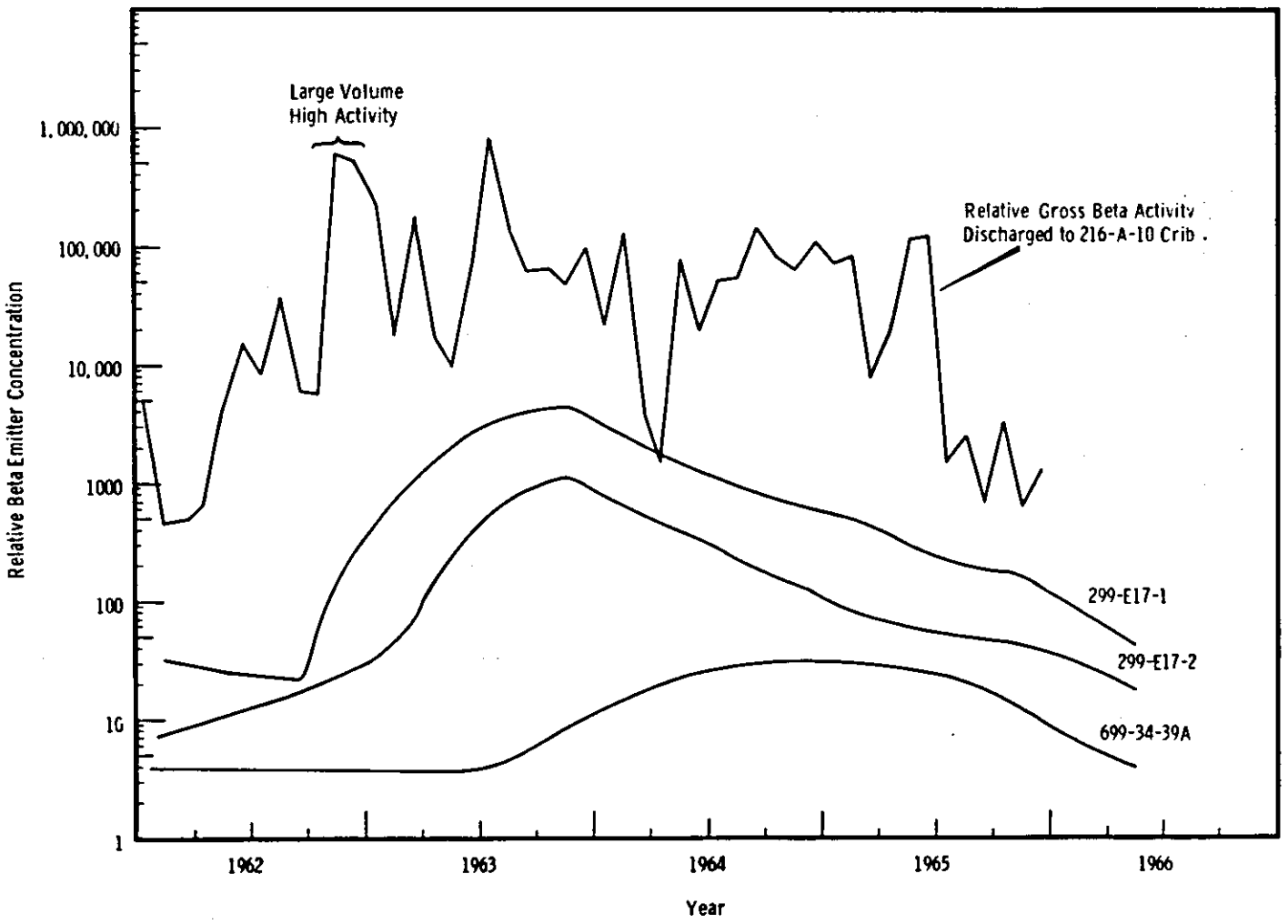

FIGURE 2

Response of Monitoring Wells to Gross Beta Activity Discharged to 216-A-10 Crib

and .04 pCiSr^{90}/cc. Sample C, taken when ground water was first encountered, contained 790 pCiβ/cc. Sample D was taken from well 299-W22-26A after it was completed at 215 feet and bailed. This sample contained 9700 pCiβ/cc and no detectable Sr^{90}. The caliche and clay layer encountered at 146 feet has an extremely low permeability and is causing the waste to saturate the silt layer above it. The activity measurements shown in Figure 3 were made with a G.M. at the surface of the soil material taken from the well. The activity on the soil samples below the caliche and clay layer is several orders of magnitude below the activity in the ground water in well 299-W22-26. This is contrary to laboratory column tests which generally show activity concentrations in soil material are higher than in the solutions passing through the columns. This probably indicates that the relatively high activity levels reflected in wells at the 216-S-9 crib are due to waste channeling down the outside of the monitoring well casing from the saturated zone. The inside of the casing of well 299-W22-26 was inspected to detect leakage and none was found. Changes in sampling structures near crib sites where perched waste zones might occur may be necessary to obtain representative samples of the ground water.

Alpha contamination was detected at the 216-Z-7, 216-Z-12, 216-U-1 and 2, 216-S-20, 216-S-21, and 216-S-9 crib sites. Isotopic analyses of ground water from beneath the 216-Z-12 and 216-S-21 cribs revealed that the water contained <.007 pCiPu/cc. The filtered material from the sample taken at 216-Z-12 contained 8 pCiPu/gm, and at 216-Z-21 the filtered material contained 0.2 pCiPu/gm. This indicates that the positive alpha counts which have been reported are probably due to samples which were not filtered or were poorly filtered. Plutonium is evidently reaching the ground water, but at such low concentrations that it is not detectable in the ground water. Also, appreciable removal of the Pu by fine-grained sediments in the saturated zone is indicated.

Active Separations Disposal Sites

The concentrations of radioisotopes in the ground water at active disposal sites are listed in Table I. Analyses are made for critical isotopes at the major disposal sites. Minor active cribs and french drains are not included in the table. A blank in the table indicates that the particular analysis was not made on samples from the site. The concentrations listed from each site are those noted in samples from the well(s) that showed the highest concentration.

600-Area Beta Contamination

Beta concentrations detected in 600-Area wells are tabulated in Table I of the Appendix, and extent of beta contamination in the ground water is shown in Figure 1.

The beta contamination pattern has not changed significantly in the past six months; but due to minor concentration changes in wells near the border of the 0.09 - 1 pCi/cc zone on the beta contamination map, the 200 West and 200-East Area plumes were joined and several isolated areas above the 0.08 pCi/cc detection limit are shown. Samples taken from selected wells were analyzed for tritium, total beta, total alpha, sulphate, sodium, calcium, and nitrate. The results, presented in Table II, show that there have been measurable increases in non-radioactive as well as radioactive materials in the ground water due to waste disposal operations. The concentrations of non-radioactive materials in the ground water are due directly to waste disposal and to degradation of minerals in the soil by the wastes. Concentrations of the non-radioactive materials in the ground water are below the Public Health Service recommended drinking water limits except for nitrate which is above the recommended 45 ppm limit in several wells.

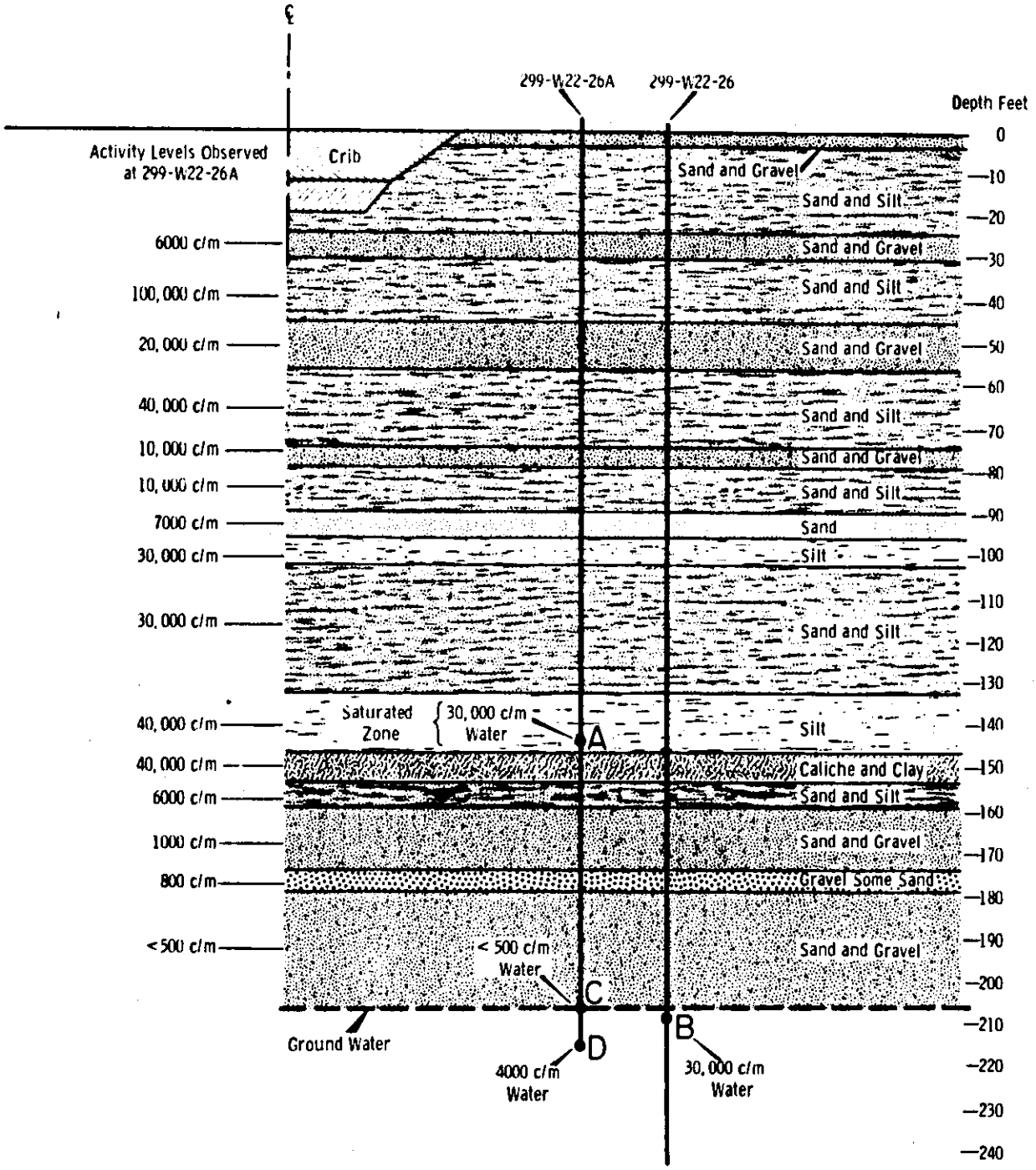

FIGURE 3

216-S-9 Crib Section

Table I

Activity In The Ground Water At Active Crib Sites

Crib	Waste	Average Concentrations, January-June, 1966 pCiβ/cc	pCiα/cc	pCi Sr^{90}/cc	pCi Cs^{137}/cc	pCi Co^{60}/cc
Purex						
216-A-8	Tank Farm Condensate	1.4	---	0.01	<0.01	<0.02
216-A-9	Acid Fractionator and 100-N	---	---	---	---	---
216-A-10	Process Condensate	168.2	0.01	0.01	<0.01	<0.02
216-A-27	Laboratory and Floor Drains	28.1	<0.01	0.18	<0.01	---
216-A-31	Organic Waste	69.7	<0.01	<0.01	<0.01	---
216-A-36B	Scrubber Waste	62.8	---	0.18	<0.01	2.8
B-Plant						
216-B-7	Decontamination	2.0	0.05	<0.01	<0.01	2.8
216-B-50	ITS and Tank Farm Cond.	10.7	---	<0.01	---	2.1
C-Plant						
216-C-10	Process Condensate	0.84	---	0.05	---	---
Redox						
216-S-6	Process Condensate	<0.08	---	---	---	---
216-S-9	Process Wastes	5901	0.01	0.03	25.0	6.0
216-S-13	Wastes Containing Hexone	0.22	<0.01	---	---	---
216-S-20	Laboratory Wastes	0.37	0.01	0.02	---	---
216-S-21	Tank Farm Condensate	1.1	0.01	0.02	---	---
T-Plant						
216-T-19	Process Condensate	1.7	---	0.02	<0.01	---
216-T-27	Decontamination	4383	---	0.02	<0.01	---
216-T-34	300 Area Lab Wastes	<0.08	---	<0.01	<0.01	---
U-Plant						
216-U-1&2	Decontamination & Cell Drain	0.55	0.16	---	---	---
216-U-12	Process Condensate	2.4	<0.01	---	---	---
Z-Plant						
216-Z-1A	Recovery Process Wastes	1.48	<0.01	---	---	---
216-Z-7	Floor Drains	1336	2.0	5.0	<0.01	0.02
216-Z-12	Nutralized Process Wastes	0.55	0.01	---	---	---

Table II

Ground Water Sample Analysis

Well No.	Miles From Processing Facility	H^3 pCi/cc	T_β pCi/cc	T_α pCi/cc	SO_4 ppm	NO_3 ppm	Na ppm	Ca ppm
699-34-39A	2.0	2300	17.0	<.01	77	68.6	34	45
699-28-40	2.6	83	0.21	<.01	44	6.8	19	25
699-30-31	3.8	2560	0.15	<.01	65	36.3	32	30
699-24-33	4.0	604	5.5	<.01	70	34.5	27	48
699-41-23	4.9	480	0.21	<.01	69	36.8	27	42
699-15-26	6.1	484	0.45	<.01	72	45.4	22	48
699-20-20	6.4	694	0.22	<.01	72	37.7	17.5	55
699-26-15	6.9	1200	0.59	<.01	69	55.5	32	39
Average Concentrations in Columbia River at Hanford, January - June, 1966					13.2	0.42		22.4(4)
Average Concentrations in Ground Water Prior to Significant Plant Disposal					21.5	2.2	19.4	28.6(5)

CONTAMINATION IN CONFINED AQUIFERS

Beta emitter concentrations detected in samples taken at various depths, and in some instances from confined aquifers, below the water table are listed in Table II of the Appendix.

Depth sampling in wells and samples taken from specific aquifers over the past years have shown that some activity is being carried into the confined aquifers beneath the project. The extent of waste spread in confined aquifers is difficult to evaluate because of the limited points at which they can be sampled. Well drilling project CAC - 159 (Isochem) which provided monitoring access to the confined aquifers southeast of 200-East Area was completed, and initial samples from the wells were analyzed. The wells near the river showed no detectable gross beta concentrations. Well 699-36-46, southeast of 200-East Area, contained a maximum concentration of 3.6 pCi/cc. Further sampling and development of these structures is planned.

WELL DRILLING

Wells are being drilled around several disposal sites in 200-West Area for the inventory of activity above the ground water table in connection with Ben Franklin Dam Studies. Many of these wells will be later available for ground water monitoring purposes.

REFERENCES

1. J. R. Eliason. Earth Sciences Waste Disposal Investigations, July - December, 1965, BNWL-CC-574. April, 1966.

2. D. J. Brown and V. L. McGhan. Hanford Wells, HW-44355 Rev. 2, January, 1963.

3. D. J. Brown and W. A. Haney. Chemical Effluents Technology Waste Disposal Investigations, July - December, 1963 -- The Movement of Contaminated Ground Water From The 200 Areas to the Columbia River, HW-80909. February 18, 1964.

4. T. H. Essig and J. K. Soldat. Radiological Status of The Hanford Environs, BNWL-CC-580 1-6 January-June, 1966.

5. R. C. Newcomb and J. R. Strand. Geology and Ground Water Characteristics of the Hanford Reservation of the Atomic Energy Commission, Washington, USGS-W-P-8, December, 1953.

APPENDIX

TABLE I. Radiological Monitoring Data from Ground Water Samples, January - June, 1966
Gross Beta Activity (Unconfined Ground Water Aquifer)

Well Designation	Avg. Conc. pCiβ/cc	Max. Conc. pCiβ/cc	Conc. In Latest Sample pCiβ/cc	Avg. Conc. July-Dec., 1965 pCiβ/cc
200-East Area				
Wells Monitoring 216-A Disposal Facilities				
299-E16-2	.22	.46	.46	.29
299-E17-1	42.2	45.2	45.2	181.00
299-E17-2	22.8	33.5	14.6	42.6
299-E17-3	28.1	38.7	15.2	64.0
299-E17-4	19.7	38.8	16.6	10.0
299-E17-5	62.8	99.3	39.8	76.0
299-E17-6	1.3	5.8	.50	18.0
299-E24-1	39.7	54.9	33.9	69.0
299-E24-2	168.2	274.2	69.1	242.0
299-E24-9	69.7	125.2	33.8	121.0
299-E25-2	.23	.35	.15	.38
299-E25-3	.57	.62	.60	1.8
299-E25-4	.72	1.4	1.4	---
299-E25-5	.89	1.19	.59	---
299-E25-6	.48	.55	.41	---
299-E25-7	1.40	1.79	1.00	---
299-E25-10	1.4	2.2	.54	2.4
299-E25-11	.62	.83	.38	.80
299-E25-12	.43	1.3	.38	.32
299-E26-2	.30	.48	.22	1.14
299-E26-3	1.3	2.1	.93	2.1
299-E26-4	1.6	2.3	2.0	4.0
299-E26-5	.85	.96	.73	1.5
Wells Monitoring 216-B Disposal Facilities				
299-E24-8	2.4	5.9	1.0	---
299-E27-5	.84	.90	.90	---
299-E33-3	10.7	21.0	3.9	1.6
299-E33-6	<.08	.18	<.08	.33
299-E33-8	<.08	.21	<.08	.12
299-E33-13	.79	.97	.72	2.0
299-E33-15	4.7	6.1	3.2	3.9
299-E33-18	2.0	2.4	2.4	9.3

TABLE I. (Continued)

Well Designation	Avg. Conc. pCiβ/cc	Max. Conc. pCiβ/cc	Conc. In Latest Sample pCiβ/cc	Avg. Conc. July-Dec., 1965 pCiβ/cc
Wells Monitoring 216-BC Disposal Facilities				
299-E13-16	.17	.26	.25	<.08
299-E13-20	.14	1.9	.09	.22
Wells Monitoring 200 East Area Outside Specific Disposal Sites				
299-E19-1	.21	.62	<.08	.23
299-E23-1	<.08	.30	<.08	.09
299-E23-2	.13	.15	.15	.14
299-E24-7	.21	.39	<.08	.19
299-E25-1	.24	.24	.24	1.2
299-E27-1	1.7	2.3	1.0	3.6
299-E28-4	<.08	.10	<.08	.12
299-E28-5	.14	.25	.15	.22
299-E28-7	.20	.26	.26	.22
200-West Area				
Wells Monitoring 216-S Disposal Facilities				
299-W22-1	160.5	322.6	322.6	154.0
299-W22-2	1.5	1.7	1.5	---
299-W22-7	.15	.24	.10	.15
299-W22-14	295.2	362.8	362.8	396.0
299-W22-20	.37	.47	.34	1.1
299-W22-21	.22	.35	.35	---
299-W22-25	2924.0	6332.0	2790.0	1.6
299-W22-26	5901.0	9086.0	7448.0	19.0
299-W22-27	21.8	75.1	10.0	4.3
299-W22-28	.08	.19	<.08	.13
299-W23-2	.74	1.1	.20	.15
299-W23-3	.14	.19	<.08	---
299-W23-4	1.1	3.8	.28	.30
Wells Monitoring 216-U Disposal Facilities				
299-W19-2	.09	.17	.17	.08
299-W19-3	.55	2.0	.97	.2
299-W21-1	<.08	.20	<.08	.08
299-W22-22	2.4	10.3	4.1	.08

TABLE I. (Continued)

Well Designation	Avg. Conc. pCiβ/cc	Max. Conc. pCiβ/cc	Conc. In Latest Sample pCiβ/cc	Avg. Conc. July-Dec., 1965 pCiβ/cc
Wells Monitoring 216-T Disposal Facilities				
299-W6-1	<.08	.12	.12	.11
299-W11-10	<.08	.12	.12	.12
299-W11-14	.09	.11	<.08	---
299-W12-1	.11	.15	.09	.08
299-W14-3	4383	12,000	380	5466
299-W15-3	.15	.20	.11	.37
299-W15-4	1.7	2.3	1.3	1.6
Wells Monitoring 216-Z Disposal Facilities				
299-W15-7	1336.0	2290.0	383.0	---
299-W18-1	.36	.89	.89	.29
299-W18-5	.55	1.4	1.4	---
299-W18-6	1.48	1.97	.99	---
299-W18-7	.08	.11	<.08	.17
600 Area Wells				
699-S12-29	.11	.18	<.08	<.08
699-S8-19	.14	.16	.13	<.08
699-S6-E10	.12	.14	.13	.12
699-S2-E12	<.08	.08	.08	.10
699-8-17	.09	.13	.13	.09
699-10-E12	.23	.23	.23	.12
699-15-26	.42	.45	.42	.43
699-19-58	.14	.24	<.08	<.08
699-20-20	.22	.22	.22	.15
699-24-33	5.5	5.5	5.5	---
699-24-46	<.08	.08	.08	<.08
699-26-15	.59	.59	.59	.34
699-27-8	.08	.10	<.08	.13
699-28-40	.18	.32	.13	.26
699-29-78	.09	.14	<.08	.11
699-30-31	5.58	10.2	1.2	---
699-31-53B	.08	.10	.10	<.08
699-31-65	.09	.10	.08	.08
699-32-62	.09	.09	.08	<.08
699-33-56	.09	.22	<.08	<.08
699-34-39A	4.6	6.9	4.6	17.0
699-34-88	.10	.13	<.08	<.08
699-35-70	.08	.13	.08	<.08
699-38-65	<.08	.10	<.08	<.08
699-38-70	<.08	.10	<.08	<.08

TABLE I. (Continued)

Well Designation	Avg. Conc. pCiβ/cc	Max. Conc. pCiβ/cc	Conc. In Latest Sample pCiβ/cc	Avg. Conc. July-Dec., 1965 pCiβ/cc
699-40-1	<.08	<.08	<.08	.16
699-40-62	.09	.09	.09	.08
699-41-23	.16	.24	.13	.28
699-42-42	.12	.16	.10	<.08
699-44-64	.12	.15	.15	<.08
699-45-69	.09	.16	<.08	<.08
699-47-35	.12	.20	<.08	.14
699-47-46	<.08	.10	<.08	<.08
699-47-60	.09	.16	<.08	<.08
699-50-30	<.08	.10	<.08	.08
699-50-53	3.6	6.6	6.6	6.2
699-50-85	.08	.08	.08	<.08
699-53-55	<.08	.08	<.08	<.08
699-54-57	<.08	.13	<.08	<.08
699-55-50A	.31	.38	.24	.33
699-55-76	.26	.50	<.08	<.08
699-55-89	.09	.26	<.08	.09
Hanford 6	<.08	<.08	<.08	.16

Other Wells were sampled and found to be below the routine detection limit of 0.08 pCiβ/cc.

TABLE II. Radiological Monitoring Data from Confined Ground Water Aquifers, January - June, 1966, Gross Beta Activity.

Piezometer Tube Designation	Depth Below Water Table	Avg. Conc. pCiβ/cc	Max. Conc. pCiβ/cc	Conc. In Latest Sample pCiβ/cc	Avg. Conc. July-Dec., 1965 pCiβ/cc
600 Area					
699-S31-1P	141	<.08	<.08	<.08	.44
699-S18-E2P	168	<.08	.12	.12	2.5
699-S14-20P	74	.10	.10	.10	<.08
699-S12-29P	84	.09	.12	<.08	<.08
699-S6-E14P	178	.51	.60	.59	.89
699-S6-E4P	377	.34	.47	.30	.40
699-10-E12P	283	.19	.23	.22	.22
699-20-E12P	260	.22	.25	.18	---
699-28-40P	313	.09	.13	<.08	---
699-30-31P	503	.12	.20	.13	.10
699-30-31R	333	.51	.55	.49	.33
699-30-31S	243	.30	.33	.29	.37
699-42-42P	106	.10	.20	<.08	.10
699-55-50P	55	.38	.43	.33	.87